DEPARTMENT OF THE ARMY
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Engineering and Design
ICE ENGINEERING

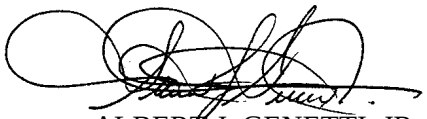
1. Purpose. This manual, composed of three parts, presents in Part I the current guidance for the planning, design, construction, and operation and maintenance of ice control and ice suppression measures for Corps of Engineers projects; provides in Part II the current guidance for dealing with ice jams and the resultant flooding, including preventive measures; and gives in Part III the current guidance for engineering and operational solutions to ice problems on rivers used for navigation.

2. Applicability. This manual is applicable to all USACE commands having responsibility for civil works design, construction, operations, and maintenance.

3. Discussion. All Corps projects subjected to freezing temperatures have ice problems, such as: ice buildup on lock walls, hydropower intakes, and lock approaches; ice accumulation in navigation channels; ice passage over spillways that scours the downstream channels; and ice damage to shore structures and shorelines, etc. Therefore, ice control measures should be considered for both new and existing projects to improve operations and safety in cold regions. In Part I this manual discusses ice formation processes, physical properties, and potential solutions to associated problems. Part II considers the problem of ice jams and ice jam flooding, and discusses a broad range of mitigation measures. Part III of this manual addresses the considerations that arise from winter navigation on inland waterways, including the conduct of river ice management studies and the preparation of river ice management plans.

4. Distribution statement. Approved for public release, distribution is unlimited.

FOR THE COMMANDER:



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This manual supersedes EM 1110-2-1612, dated 31 December 1996.